GreenSolRes

Deliverable 2.6

Report on implementation of optimal catalyst conditions in CSTR system

Demonstration of solvent and resin production from lignocellulosic biomass via the platform chemical levulinic acid

The project leading to this application has received funding from the Bio Based Industries Joint Undertaking under the European Union's Horizon 2020 research and innovation programme under grant agreement No 720695

BBI JU

Bio-based Industries Consortium

Horizon 2020
European Union Funding
for Research & Innovation

About GreenSolRes

The need to establish economic and sustainable large-scale operations for the conversion of renewable resources to chemical building blocks is becoming increasingly urgent in the context of climate change and depleting fossil fuel reservoirs. Pathways for manufacturing of bio-based fuels and chemicals have been developed but most of them rely on sugar and starch crops for feedstock. GreenSolRes aims at a sustainable and competitive industrial production of the platform chemical levulinic acid (LVA) from non-food lignocellulosic biomass. Further, the conversion of LVA and LVA esters into industry relevant building blocks γ-valerolactone (GVL), 1-methyl-1,4-butanediol (MeBDO) and 2-methyltetrahydrofuran (2-MTHF) will take place by new catalytic methods developed during the course of this project. Finally, these chemicals will be upgraded to solvents and resin monomers for the production of high added value adhesives and consumer products. This project was started in September 2016 and has a duration of five years.

Project Coordinator

Project Office

Consortium

About this document

Deliverable №:	2.6
Title	Report on implementation of optimal catalyst conditions in CSTR system
Workpackage:	2
Responsible beneficiary:	RWTH Aachen University
Author:	Pascal Albrecht, Celine Jung, Bernhard Barwinski, Walter Leitner, Jürgen Klankermayer
Reviewers:	Hybrid Catalysis
Version:	1.0
Due date of deliverable:	30.06.2020
Version date:	29.05.2020
Contact:	Jürgen Klankermayer
Nature:	Report
Review status	WP leader accepted 29.05.2020
	Reviewer accepted 03.06.2020
	SC accepted 22.06.2020
	Coordinator submitted 24.06.2020

Dissemination Level		
PU	Public	
CO	Confidential, only for members of the consortium (including the Commission Services)	X

Publishable Summary

Ruthenium/triphos catalysts have been found as promising catalyst lead structure for the hydrogenation of Levulinic acid (LVA) to γ-valerolactone (GVL), 1-methyl-1,4-butane-diol (MeBDO) and 2-methyltetrahydrofuran (2-MTHF). The envisaged application of the system in a continuous stirred tank application (CSTR) requires detailed tailoring of the molecular catalyst for application in a reaction system on enlarged scale. Consequently, catalytic hydrogenation of LVA was performed in 500 mL autoclaves with selected catalyst systems, resulting in good yields of GVL and MeBDO as the main product. The investigation on optimized reaction parameters were made at combined variation of the hydrogen pressure, the reaction solvent and the selected ruthenium/triphos catalyst structures, resulting in suitable reaction parameters for the CSTR application.